

that place by members of his own family, but so far as we can learn this temperature record for Fairmount is not referred to in any of the published tables of temperature data for the State of New York. A record that began about the year 1800 and was continuous until 1859, or later, would be of great value in climatological studies, and if this record still exists it should be not only preserved but made accessible for the use of students of climatology.—[C. A.]

RECENT EARTHQUAKES.

September 18, at Brigham City, Utah, 10:45 a. m.

September 25, throughout eastern Maine, as follows: Bangor, 1:05 p. m., lasting ten seconds, heavy rumbling noise and alarming shaking of houses; Thomas hill, highest part of Bangor, 1:07 p. m.; Brewer, more severe than in Bangor; Bingham and Somerset, about 1:00 p. m.; Solon and neighborhood, lasted four seconds; Belfast, two shocks at 1:05 p. m., the first lasting *five* and the second lasting *ten* seconds; also felt in the neighboring towns of Winterport, Brooks, Searsport, Liberty, Burnham, City Point, Swanville, and Waldo; Farmington, 1:03 p. m., lasting five seconds; Rockland, a few minutes after 1:00 p. m., and at all places in its neighborhood.

September 2, St. Thomas, W. I., at 11:30 a. m., a rather sharp earthquake shock of scarcely any duration, commonly known here as a "rumble and a jerk."—[C. A.]

DEPTH OF HAIL FALL.

It is very common for observers to state that hail fell during a given storm, and to specify the size of the hailstones, but no measurement or estimate is given as to the quantity of hail, expressed in depth of fall, as is done in the case of snow and rain. During the past summer several remarkable falls of large hailstones have been reported, as in the subjoined list. In each of these and in similar cases it is desired to know how large an area is covered by the hail and what would be the depth of the equivalent uniform layer of solid ice uniform over the whole area. In the case of the storm reported by Mr. Jennings, at Topeka, Kans., a photograph was sent to the Editor, which appeared to show that over a portion of the landscape the hailstones lay upon the ground just about contiguous to each other, and the stones averaged, from the observer's own measurement, 4 inches in diameter. The thickness of the equivalent layer of ice is, therefore, the depth to which each sphere would cover its corresponding regular circumscribed hexagon. Now, the volume of the sphere is $\frac{4}{3}$ by 3.1416 times the cube of the radius; the area of the circumscribed hexagon is 2 by 1.7320 by the square of the radius. Therefore, the sphere of ice will cover its hexagon to the depth of 1.209 multiplied by the radius of the sphere. In other words, a layer of contiguous spheres of ice 4 inches in diameter is equivalent to a solid layer of ice 2.418 inches thick. A layer 7 inches deep of hailstones a quarter of an inch in diameter, or one-eighth of an inch radius, would be equivalent to about 1.06 inch of ice. The factor 1.209 will enable any observer to convert his hail fall into an equivalent sheet of ice. The remarkable hailstorms to which we have alluded were the following:

Topeka, Kans., 1897, June 24, first thunder heard at 6:55 p. m. in the north and the last at 8:45 p. m. in the south; wind before the storm, south, after the storm, northeast; temperature before the storm, 88°, afterwards, 72°; hail began at 7:35, ended, 7:40 p. m., 4 inches in diameter; hail began again, 7:38, ended, 7:43 p. m., and 0.7 in diameter; hail began again, 7:48, ended, 7:50 p. m., 0.4 in diameter; rain began at 7:35, ended, 8:15 p. m.; total amount, 0.28. While the big hail was falling the observer measured a dozen, with the following resulting diameters: 6.00, 5.25,

5.00, 4.75, 4.00, 3.50, 3.00; the average being 4.00 inches. Some of the largest stones were merely aggregations of small stones, while many of them were solid ice in layers, like an onion; one, weighing 2 pounds, went through the roof of the electric power house. The barometer rose 0.2 inch and returned to its former reading. The temperature fell from 88°, at 6:30, to 79°, at 8 p. m., and then, in a few moments, to 69°, the pen rising and falling over the same space until it had badly blurred the record. The wind whipped to north as the hail began and attained a maximum velocity of 35 miles, which, however, did not extend to the western limits of the city. Many stones emitted light on striking the hard pavement.

Pueblo, Colo., June 24, first thunder, 7:44 p. m.; storm came from the southwest and moved toward the northeast; temperature before the storm, 78°, afterwards, 63°; maximum wind during the storm, 36 miles, from the northeast; hail began at 8:15 and ended at 9 p. m.; it began again at 11:25 and ended at 11:40 p. m. The largest seen by the observer measured one-half inch in diameter and was conical in shape, as were most of the stones that were examined. The hail was much heavier in the southern portion of the city, and for a few miles southward, where lumps of ice measuring $3\frac{1}{4}$ inches in diameter and weighing $8\frac{1}{4}$ ounces were reported.

An account of a remarkable hailstorm is buried in the Transactions of the American Institute for the years 1864–65, Vol. XXIV. We quote from page 323 of that volume. Mr. J. M. Root described the hailstorm of June 10?, 1849, on the great plains of western Nebraska, 50 miles east of Fort Laramie (N. 42° 12', W. 104° 31', in eastern Wyoming). Some of the stones which fell measured 14 inches in circumference; they were composed of solid ice with smaller portions adhering to them; he noticed that some of these hailstones were of conical form and only about 3 inches in circumference. The hailstorm lasted from ten to fifteen minutes. On the same page Mr. Maynard describes the hail that fell in New York City in August, 1862, as having had a conical shape, while others were described by Dr. Rowell as concave and resembling somewhat a rough oyster shell.—[C. A.]

HIGH LEVEL STATIONS IN JAMAICA.

The publications of the Weather Office at Kingston, Jamaica, consist of monthly or occasional bulletins published first in the Jamaica Gazette and reprinted as a regular series of reports, and annual summaries published in the official "Handbook of Jamaica" especially for 1881 and 1893. These publications give in detail the observations made at Kingston at 7 a. m. and 3 p. m. daily, also a monthly summary for seven stations as to pressure, temperature, wind, and cloud; the monthly rainfall and extremes of temperature for Blue Mountain Peak (7,423 feet above sea level) and, finally, the monthly rainfall data for about 250 stations distributed over the whole island. No detailed observations are made at the summit of Blue Mountain, owing to the expense of maintaining an observer on this place, which is not easily accessible; the monthly record is obtained by ascending the peak as nearly as possible on the last day of each month. Until the establishment of a permanent station on some peak, such as St. Johns (6,100) or Blue Mountain (7,423), it is probable that the station at the Cinchona Plantation, called Hill Gardens (N. 18° 5', W. 76° 39'; altitude, 4,907 feet), will continue to be the highest on the island; it is about seven miles west-southwest of the summit. We are pleased, therefore, to have the privilege of publishing a portion of the record for Hill Gardens in detail, in lieu of that for any higher station, inasmuch as the changes going on in the upper strata undoubtedly work downward toward the earth's surface and will, when we have learned to properly interpret them, enable us to understand the storms and weather of the lower strata.—[C. A.]